1: Burrows--18-19 (1947-48) Woleaians
116, 231, 136

"The existence of native names, not obviously borrowed, for all three species (gelago, dog; sirð, hog; malʾok, fowl) suggests that knowledge of all these animals may be ancient. One of the songs collected contains a mythical account of the introduction of fowls from heaven. A man named Galuai, carried up there by a huge bird, tied several fowls to his body just before he jumped back to earth. They softened his fall by flapping their wings. But apart from questions of historical accuracy, Galuai came from Yap, and returned there. Moreover, the whole story is so different from anything else collected on Ifalik that it looks like something borrowed from a different culture. [19]

One possibility is that the three domesticated species have indeed been known on Ifalik from ancient times, but have died off, perhaps more than once. A typhoon big enough to wash over the island might wipe out any or all of them. In that case, their re-introduction may well be recent. In the case of the dogs, if re-introduction was from another island, they could still be of an old native breed."

"As to wild fauna, the only small forms which the natives consider important are pests. They are beginning to be aware, through foreign instruction, of harmful bacteria. Lice infest their heads, and they may be seen delousing each other's hair as a friendly service.

Mosquitoes abound. Two varieties were noticed. One is a small black day-flying kind, common about houses and in other shady places. (Pipiens?) The other is larger, lighter in color, with striped legs, and is active at night. Mosquitoes can be blamed for filariasis, which is not very prevalent. It is probably unnecessary to add that all this part of the Pacific is free from malaria.

Flies are even more numerous than mosquitoes. They gather in swarms about food that attracts them, particularly fish and crustaceans. The commonest kind is black, the same to a layman's eye as the common house fly of America. Another is rusty in color, slimmer, with red eyes and wings that stand out from the body.

Nothing was seen or heard of centipedes or scorpions. Spiders of various kinds are common. None was pointed out as dangerous.

There are no snakes, but lizards of several kinds are pentiful. [sic] Common about the houses is the little dark kuel (a geko, perhaps Lepidodactylus lugubris). The people are said to fear it because one moment you see it, the next you don't. This fear does not seem to trouble them much, though. Another small variety is the blue-tailed skink (Emoia cyanura--Lesson). Far from being feared, these have been seen to jump on a

man's bare leg and off again without attracting any apparent notice. A larger, glossy black lizzard, the tagurupai (not identified), is noticeable especially on the trunks of coconut trees. Big monitor lizards (galūf; probably Varanus indicus--Daudin) are found on Falālap, where they are said to have been introduced to prey on rats. The natives say they also eat eggs and young chickens. The people maintain that there are none on Falārik. No large ones were seen there. Smaller ones of similar color are said to be of a different kind."

"There are few varieties of land birds. The Micronesian starling (some sub-species of Aplonis opacus) is a common scavenger about the houses. Another is a versatile little songster (lltri), equally at home among the trees, where it catches flies with snapping bill, or on the ground, where it picks at crawling creatures or garbage. In color it is rusty brown on the back, light gray below. This color and its excellent singing suggest a small thrush or chat (turdus obscurus?).

Wading shore birds are more varied. The Pacific golden plover (kulong; Pluvialis dominica fulva Gmelin) is a dooryard bird during that part of the year when it is to be found on Ifalik. Mention in songs and in conversation showed that the natives have a kind of fondness for it, as Americans and English have for the quite different species called 'robin' in their two countries. Other wading birds are turnstone (nigenrouru; probably Arenaria interpres Linn.); an unidentified species with long straight bill (bwongupalei; perhaps a dotterel, charadrius;) [20] wimbrel or curlew (liak; probably numenius phaeopus variegatus (Scopoli); another known only by name, garevāsh, but from the description quite like the curlew; and herons of three colors--white, 'blue' or slaty; and sooty, virtually black. All were called by the same name, (liapellk), and all may be forms of the reef heron (Demigretta sacra).

Passing migrants included swallows, seen over the lagoon for a few evenings, and hawks of some broad-winged kind, a pair of which spend about a week on Falārik. Of all the birds mentioned, only the plover seemed to attract more notice among the people

than any other familiar bit of landscape.

Sea-birds are numerous and have some importance. One variety, the noddy tern (kurugao; Anous sp.) is used for food. Another common variety is the white fairy tern (giegie; Gygis alba). These two nest on Ifalik. Both indicate the presence of schools of fish by hovering over them and swooping to catch the small fry on which the school is feeding. Other kinds of tern are seen occasionally, among them the black-naped tern (sterna sumatrana; native name uncertain), but apparently do not nest on the island. The white tropic bird or bos'n bird (mālu; Phaethon lepturus) is not common, but is occasionally seen. It is said to be plentiful on uninhabited West Fayu. The same is true of the frigate bird or man o'war bird (getaf; Fregata sp.). The natives have an esthetic admiration for this bird and its soaring flight.

Names of other sea birds were collected, but the birds were not seen and could not be identified. The kemā or xemā, described as a large bird 'some of them white, some blue', might be a booby. 'Blue' is a poor name for the color of the brown ones, but Tom's English was far from precise about colors. No boobies nest on Ifalik, but brown ones were seen at sea not far from there. Koro is a long-tailed seabird, also in two colors; koro wet, a white one, and koro rol, black. Still other varieties mentioned in the lore of navigation are paiennai (white, larger than fairy tern); metalipangerale, with long tail feathers (possibly 'Captain's language' for some species with a different common

name); and gerap, a small black and red bird. (The description fits the cardinal honey-eater (Mysomela cardinalis) found on high islands in that part of the Pacific; but that is a land bird.)"

1: Burrows--20 (1947-48) Woleaians
116, 136 Ifalik

"No flying-fox or other bats were seen on Ifalik. The only mammal, other than the three domesticated ones already discussed, is the rat. For a time they overran our tents at night. We set traps and caught one every night for more than a week. After that, whether because of the traps or because a cat began to include a visit to us in its nightly rounds, they did not trouble us again until near the end of our stay. In general, while they were certainly common, they did not seem inordinately numerous. Those we caught were not very big; brownish on head and back, light gray underneath. Some larger and apparently grayer ones were seen among the coconut trees, but not clearly enough to give a definite impression as to whether they were of a different species. Rats are not eaten."

1: Burrows--20-21 (1947-48) Woleaians
116, 136 Ifalik

"There are several kinds of land crabs. Hermit crabs (yng) are common on the beaches and about the houses. They are not recognized as of any importance, though they may be useful as scavengers. A larger, dark kind (arIk) that digs holes about houses at night, is sometimes eaten, we were told; but apparently not highly regarded. Tom said he never ate them himself. The ragōm, that lives in the ground in the bush, is eaten, also crushed to make bait for fish-traps. The usela, not seen, is described as a slow-moving crab that [21] lives in the tops of coconut trees. The largest species, and one of the choicest delicacies, is the coconut crab (afe; Birgus latro Dana). These are only the most familiar kinds. In general, any that are big enough to be worth the trouble are eaten."

"Sea animals are far more important to the people than those of air or land. Nearly all varieties that are caught are eaten. Even the whale (ras), though never caught, is eaten on the rare and memorable occasions when one goes aground on the reef. Jaw-bones of several of them were kept behind the men's house as trophies.

Exceptions to the rule of eating everything are the shark (pagõ) and octopus (sauevang? --name discussed next paragraph). This was explained as a mutual arrangement. The people do not eat shark and octopus, so that shark and octopus will not eat them. Once a small octopus-like creature, stuffed into a Japanese mess-kit so that its shape did not show, was brought to us as a gift. It had tentacles, and I now suppose it was a squid; but in asking Tom how to cook it I called it an octopus. With a contemptuous expression he told us to throw it away, saying that Japanese and Trukese eat octopus, but not the people of Ifalik. Later, after conferring with the chief who brought it, he said it was not an octopus but a gus, a rare delicacy. It was too late then for our gus to be cooked. I had not even looked at it carefully. Asked whether gus is the name for a small octopus, Tom said not. A gus, he explained, has no beak, and will not bite a hand thrust into a hole in the coral, as an octopus will. We never saw another gus.

Tom consistently gave the native name for octopus as sauevang. Some of his remarks about it, --for example, 'in the deep water they grow big, with arms like the roots of that tree'--indicated that he knew what the English word meant. Yet a group of natives

once identified as sauevang two pictures in Hosaka's 'Sport Fishing in Hawaii'; one of a conger or white eel, the other of a brown eel. They cannot have mistaken either for octopus, though they might for moray--not illustrated by Hosaka--which is common on the reef. This discrepancy was not noticed in time to clear it up.

Moray and sting-ray (fai) are apparently not eaten, though I have no verbal statement to that effect. A sting-ray brought ashore near our quarters was left hanging in a tree, then lying on the ground, for several days before it disappeared, presumably either eaten by dogs or thrown away.

In Tom's private prayer or incantation for success as a navigator, sting-ray is coupled with shark and giant clam as formidable creatures invoked towatch over him. In translating, he said that the giant clam, called trewai in the incantation, is found only on high islands. We saw no very large Tridacna, but small ones are common on the reefs. They seem not to be important as food. Large trumpet shells are found occasionally, the flesh eaten, and the shell used as a container or kept on the house platform as an ornament. Small shellfish of many kinds are gathered for food on the reef when the surf is not too high; among them sea-shails, limpets, Turbo, and at least one clam-like bivalve."

1: Burrows--21-22
116, 136, 262

(1947-48)

Woleaians
Ifalik

"Far the most important source of animal food is fish. The list of varieties to follow was obtained by two procedures. One was to collect native names of fish brought to us as gifts, or brought ashore in our presence, and of others said to be important. The other was to show groups of natives the pictures of fish in Hosaka's book, mentioned above. Size and color, not shown in the pictures, were indicated by gestures and words. The people were confident that they knew which of the fish shown in the pictures were familiar to them and which were not. They had names for most of those illustrated, -- sometimes more than one name for one picture, which may indicate [22] a difference of opinion, or more than one variety of similar form, or--what is not uncommon--one name for a species when young, another when full grown. Eliminating known cases of that kind and obvious variants of essentially the same name, the total number of names collected is 74. Names obtained in the two ways were compared. Twice the book was taken out to where a pile of fish lay waiting to be distributed. So far as the catch on those days allowed, the pictures were compared with actual specimens. The identifications that follow can probably be trusted as far as larger categories are concerned. Where a single species is widespread, even the specific identification is probably correct. In view of the rough and ready method, some mistakes must be expected. But at least the list will give an idea of the range and character of the fish taken for food."

"Classification by habitat seemed useful, but is bound to involve some overlapping, possibly some definite errors.

OPEN SEA OR SURF FISH

English or Hawaiian Name	Ifalik Name	Scientific Name
albacore	aúle	Germo alalunga (Gmelin
barracuda	serau	Sphyraena barracuda (Walbaum
blue crevally	langu (when small, saritr)	Caranx stellatus
bonito, skipjack	galangap, garangap, garʔng	Euthynnus pelamis
bonito, little tunny	ajInnéu	Euthynnus alletteratus (Rafinesque

English or Hawaiian Name	Ifalik Name	Scientific Name
dolphin, mahimahi	teparo	Coryphaena hippurus (Linn.
flying fish	mĕngōr	Cypselurus simus
horse mackerel, akule▸	agumau?*, sep*	Selar crumenophthalmus (Bloch
omaku	trep	Caranx mate [23]
sailfish	marelatīo	Istiophorus orientalis (Schlegel
uoua	iau	Neomyxus chapitali (Eydoux and Souleyet

"* Native reports inconsistent.

▸ To me, a fish they called lipau looked very like what in Hawaii is called akule; but the chief Maroligar insisted it was not the same as the picture."

English or Hawaiian Name	Ifalik Name	Scientific Name
wahoo, ono	ngeli	Acanthocybium (Cuvier
yellowfin tuna, ahi	tangēr, tanglri, (when small, tagū	Neothunnus macropterus (Schlegel
	LAGOON FISH	
flounder	lipēri	Platophrys mancus (Broussonet
milkfish	autā*	Chanos chanos
mullet	geraf, autā*	Mugil cephalos
needlefish	ewo.kang, ta'aku	Belone playura

"* Native reports inconsistent."

English or Hawaiian Name	Ifalik Name	Scientific Name
red squirrelfish	mol	Myripristis murdjan (Forstal
shiner (? silvery, with rosy blotches)	oerIk	(Anchoviella purpurea?)
threadfish, moi	rerepago*, 'absent'*	Polydactylus Sexfilis
	REEF FISH	
alaihi	gutr or kotr	Holocentrus diadema
balloon fish	taūsh	Chilomysturus affinis
balloon fish	lotr; when small, wat	Tetrodon hispidus (Linnaeus

"* Native reports inconsistent."

English or Hawaiian Name	Ifalik Name	Scientific Name
banded damselfish	maze	Abudefduf (Quoy and Gaimard [24]
goatfish	'many kinds': fauligi, semarubwong, seuiarang (yellow), shou, sounalo, perhaps others.	Pseudupeneus
hawkfish, black-sided	galietr*, mwelialo*	Paracirrhites forsteri (Schneider
hawkfish, white-lined	lemware	Paracirrhites arcatus (Cuvier

"* Native reports inconsistent."

English or Hawaiian Name	Ifalik Name	Scientific Name
Linalea, kala	ig valevale	Naso unicornis (Forskal
maiko	gemaruaga	Hepatus lineolatus
manini	limēn	Hepatus triostegus (Linnaeus
manini, yellow	llgarigari	Chaetodon unimaculatus (Bloch
mu	tralautr	Monotaxis grandoculis (Forskal
nenue	rel	Kyphosus fuscus (Lacepede)#

"# The rel of Ifalik is probably not fuscus; at least it has no brown or tawny tinge, but looks in different lights, black, gray, or gleaming silver. The scales are silver-white, outlined with black."

English or Hawaiian Name	Ifalik Name	Scientific Name
scorpion fish, nohu	lōu'	Scorpaenopsis gibbosus (Schneider
opule	gago (luku	Anampses cuvier (Quoy and Gaimard
pao'o	limwale	Salarius zebra (Vaillant and Sauvage
papio	arong*, trep*	not given by Hosaka

"* Native reports inconsistent.
' Asked if they eat this fish, which is sometimes poisonous, natives said they do."

English or Hawaiian Name	Ifalik Name	Scientific Name
parrot fish	'Many kinds': are (red), are kulong (black-spotted), fagilimat, gauagaua glrigIri, kabwu, moguaimwe, ngItra uia (blue), perhaps others [25]	Callyodon sp.
po'opa'a	lululau	Cirrhitus pinnulatus (Schneider
long-fin razorfish	petoura	Iniistius pave (Valenciennes
redfish, big-eye	nipau	Priacanthus cruentatus (Lacepede
red squirrelfish	mol	Myripristus murdjan (Forskal

English or Hawaiian Name	Ifalik Name	Scientific Name
sandfish; a'awa	vatre	Lepidaplois bilunulatis (Lacepede
snapper	taiau	Aprion virescens (Valenciennes
spot pom	shonno	Abudefduf sordidus (Forskal
surgeon fish	evali	Hepatus bariene (Lesson
triggerfish	bwūp	Balistapus rectangulus (Schneider
triggerfish, black	perematr	Melichthys buniva (Lacepede
ulua, black	arong	Caranx sexfasciatus (Quoy and Gaimard
ulua, white	etām	Carangoides ajax (Snyder

English or Hawaiian Name	Ifalik Name	Scientific Name
ulua, silver	(when small) silalīo	Blepharis ciliaris (Bloch
upapalu	ligotro	Amia frenata (Valenciennes
wake pueo	merāp	Upeneus arge (Jordon and Evermann
wake ula	wōmei	Mulloidicthys auriflamma (Forskal
wrasse(?)[r]	pezap	not given by Hosaka
wrasse, green; hinalea	iōiō*	Thalassoma umbrostygma (Ruppell

[r] long, nearly tubular snout; about 10" long; rosy head, after parts darker.
* Native reports inconsistent."

English or Hawaiian Name	Ifalik Name	Scientific Name
kihikihi	iwājōla	not given by Hosaka"

1: Burrows--26 (1947-48) Woleaians
116, 136, 262 Ifalik

"Most prized of all animal foods is the meat of the sea turtle. Though the sight of one or two of them in the lagoon is not uncommon, they are not often taken. We knew of four being caught during our six months on Ifalik; three of them at one time. They are made still scarcer for most of the people by the fact that the highest chief has a right to all of them. He distributes first to his clan, Kovalū. Others get only what surplus he cares to distribute to them. For the lower orders, the taste of turtle is a rare delight."

1: Burrows--26 (1947-48) Woleaians
116, 136 Ifalik

"Native names of fish not otherwise identified:

fofo, an open-sea fish, may be a yard long, slim, caught in traps around drifting logs. Except for small size resembles Hawaiian ono (Acanthocybium solandri) but natives, shown the picture of ono, insisted it was a different kind.

lipwaix, a reef fish, caught by angling; eight inches to a foot long. Prominent pointed teeth. Color, blotched red and purple.

porosh--named, not seen; 'small mouth, fat inside skin.' (These characteristics resemble rel; another Kyphosus?)

ireileile--named, not seen; dorsal and ventral fins extend to tail.

orā--small yellow reef fish."

1: Burrows--83A (1947-48) Woleaians
116, 136, 227 Ifalik

"Wild animals, particularly sea creatures, are used in more varied and ingenious ways. The skin of the fish called rel, which has a silvery gleam in some lights, is wrapped around the shanks of fish hooks to serve as a lure, usually in connection with a tuft of feathers."

1: Burrows--83F (1947-48) Woleaians
136 Ifalik

"The presence of a school of bonito is often indicated by a flock of sea birds--in Ifalik the white fairy tern and the black noddy--hovering over to catch the small fry as they leap out of water to escape the bonito."

2: Damm et al. --8 [2] (1909) 1938 Woleaians
116, 136 Ifaluk

At first it seemed that the island did not have anything except mosquitoes; they appeared at twilight, and came back every night. Sarfert's boy and the interpreter had to keep a smudge fire going all night, or else they could not have stayed on the island. Formerly there were only a few mosquitoes. The following table [AN: omitted here, see source, pages 8-11] gives just a small number of the land animals; naturally there are a great many more in the ocean.

2: Damm et al. --115 [2]
116, 136

(1909) 1938

Woleaians
Aurupik

There were a great many wild doves in the jungle, while quantities of chickens ran around in the villages.

2: Damm et al. --157 (1909) 1938 Woleaians
116, 136 Faraulep

Just as on the other low coral islands, there are few land animals. Aside from the domestic ones, Hambruch only found a few species of birds. The mosquitoes are a great nuisance, especially after the rain. [CS: Omission of the vocabulary with the list of animals].

4: Krämer--193-194 (1909) 1937 Woleaians
116, 136 Woleai

...[VMM: there were] large numbers of white sea swallows, Gygis candida, flying around the trees; their squalling, alluring calls could always be heard in their flight. Strepsilas collaris is among the common beach-birds and the curlew, Numenius tenuirostris, is seen one at a time occasionally. In the bush, Sylvia syrinx and the Lamprothornis of Lukunor are found which are distinguished from a similar species of Kusae by a sulphur yellowish white [194] body with black longitudinal lines. There are no chickens and no pigeons and no pteropidae. Once a cuckoo was heard.

4: Krämer--291 (1909) 1937 Woleaians
116, 136, 137 Woleai

[ER: Indices of the fauna and flora of Oleai follow on pp. 295-298 of source, but are omitted here; they include lists of the mammals, birds, fish, shells.]

Toward noon, we tacked to the anchorage inside the lagoon [MR: on the southern side]; this spot was remarkably like the one at Lugunor. In both places the strip of land, which lay just a short distance from us, was the eastern part of the island group, but here it was composed of three separate islands, which were separated by very narrow canals, while the other was formed by the long island Lugunor, the principal one of the group. The southern one of these islands is Ra-ur, the central one Palliau, and the northern one Ulea or Uleai; it is also the entrance to the north side of the whole group. Uleai, which is the largest island of the group, is shaped like a triangle with flattened sides. Farther north on the edge of the shallows is Marion Island, which is to Uleai what Funoar is to Lugunor, except that the partially submerged reef between it and the main island is not so long as the one between the other two islands. All of these places that I have mentioned are like the Lugunor group in that they are partially covered with very tall trees, in whose shade the houses are [154] scattered, with little lawns around them. At low tide it is very easy to wade through the canals between the islands of this eastern shore, especially the one between Ra-ur and Palliau. We noticed that the large forest trees included more varieties than on Lugunor; there are fine specimens of Callophyllum ...and the Hernandia ovigera.... We saw the sea-swallow (Gygis candida) around the crowns of these trees.... Among the beach birds we saw the Strepsilas collaris...and the Numenius tenuirostris... In the bushes I found the Sylvia Sryinx and the black variety

of Lamprothornis....

On this island group there are neither hens nor doves, and we also missed the Pteropus. On the other hand I once saw [155]...the cuckoo...

The vegetation of these islands is naturally very similar to that of the Mortloks Islands... The Tacca pinnatifida, whose root should produce a fine arrowroot...is much more common than on Lugunor....

5: Kittlitz--158-61 (1827-8) 1858 Woleaians
116, 136 Woleai

We obtained a very large variety of fish here... among them, several that we had already observed in Lugunor, for example, the two fire-red kinds of Serranus (Serr. punctulatus and Serr. urodelus)... We also saw the new Myripristis....

One fish of the Labridae... was named Axodon by Cuvier in 1829... later Valenciennes called it Odax.... [159]

We saw the Iulis Gaymardi.... and a small yellow-gold kind of Iulis... which was new then; there was also a very fine Halichoeres... [160] a new Labrus... several kinds similar to the Cheilinus, among them the Sparus zonephorus, a... rather small Scarus... the remarkable Grammistes punctatus... and a particularly interesting Acanthurus which we later named Acanthurus pyroferus. Among the smaller fish we observed A. glaucopareius ... A. Rhombus nob... and Naseus incornis, Cuv...

We got two new species of Chaetodons... Ch. reticulatus and Ch. punctatofasciatus, Cuv. Then we found the remarkable Spritzfisch (Chelmon rostratus)... [161] Pomacentrus chrysurus, Broussonet.... Glyphysodon Curassao, or a fish very similar to it... a pretty black Balistes.... and another species, Balistes conspicillum Sh...

6: Senfft--53
116, 134, 136, 137

(no date) 1905

Woleaians
Woleai

The soil seems to be altogether coralline. There are no mountainous regions, and the vegetation is abundant. In spite of the thin layer of humus, the usual plant products of atolls are found here, chiefly coconut palms, which are strong and healthy, large breadfruit trees, pandanus, bananas, Calophyllum, marshmallow, arrowroot, some sugar cane, taro, Cystosperma edulis, and curcuma. There are few mangroves, and no bamboo or areca.

The fauna consists of pigs, chickens, dogs, cats, rats, and sea and land birds; there are few beetles and butterflies.

6: Senfft--53
116, 136, 137

(no date) 1905

Woleaians
Lamotrek

The vegetation is the same as on Oleai. In the central section of Lamutrik Island there is an extensive swampland in which there are copious taro and sugar cane plantations. The fauna is also the same, but there are far more sea birds and rats on this atoll, while there are no cats at all. The rats do a great deal of harm to the coconuts. The natives wrap pandanus leaves around the trunks to protect the palms from the rats; the sharp thorns of these leaves prevent the rats from running up the tree.

8: Senfft--284 (1905) 1906 Woleaians
116, 101, 175, 133, 136 Gaferut

This island [MR: Grimes] is known to the natives by the name of "Gaferut," but they have never visited it. They call it the "devil's island" and are afraid to come near it. Yet they were unable to explain their fear for not even any member of the crew of the ship had seen it. We reached the island on December 5 after dark and could not find any anchor ground. The captain sent some of his men on land who during the night were to maintain a fire in order that the ship could stay close to the land. At dawn I rowed ashore. The map of the Admiralty characterizes Grimes as an elevated island, but in reality it is a flat sandbank which in some places rises up to an elevation of 2 meters. The only type of vegetation is a species of mangrove. Apparently a strong storm hit the island a few months ago for most of the trees had lost their branches and many---including the strongest---had been completely uprooted. The fauna consists of innumerable sea birds, which had their loose nests either in the trees or on the level ground; furthermore there were coconut crabs and--to judge from the traces--large turtles, which do not visit the island but at night. The birds were so tame that they could be seized by hand. Gaferut, including the reef, has a length of about 1300 meters; exclusive of the reef it is 600 paces long and 300 paces wide. We could not find anchor ground during the day either.

13: Lutké--307-309 (1827-1828) 1836 Woleaians -1-2
116, 136 Woleai

Three days spent in the lagoons of Ouléaï provided us with a great quantity of new fish of the most interesting kinds. A new genus of the family of the Labridae (Axodon. Cuv.) was established from a single specimen I obtained; this fish appeared to us to be rare wherever we were. It is remarkable above all for the width of its front teeth; in the general shape of its body and coloring it resembles somewhat the genus Julis. We also caught [308] some specimens of the magnificent Julis Gaymardi of Quoy, as well as some new species of Chaetodon and Balistes, the Holocanthus dux and trimaculatus, the celebrated Chelmon (Chaetodon rostratus, Linn.), a couple of new species of Acanthurus and several others.

This coral group seemed to us poorer than that of Lougounor in animals of the higher orders. No Pteropus presented itself to us; and even the rat which, it would appear, is found on all these islands, is rare here. We were shown two domestic cats that were very carefully shut in, of a breed with long legs and of a reddish yellow color; we were told that they had been brought from Manilla. [sic]

We noticed here the same birds as on Lougounor, except for the hens and pigeons; on the other hand, I saw the same long-tailed cuckoo I had seen twice on Ualan and had been unable to see on Lougounor. The Sterna alba is very common here and likes to rest on the trees; the Sterna stolida and tenuirostris, on the contrary, just as on Ualan, are seen more on the water; the Sterna melanauchen...was noticed singly and seemed to

nest on the sandbanks; there we took some young specimens which we thought [309] belonged to this species; the other sea swallows, mentioned above, nest in common on the trees. We were able to obtain the nests and eggs of the Sterna stolida.

16: Gt. Britain, H.O. --503 (no date) 1933 Woleaians
116, 131, 136, 161 Gaferut

"Gaferut island, about 60 miles north-eastward of Faraulep islet (Lat. 8° 36' N., Long. 144° 33' E.), is low, wooded, and surrounded by a fringing reef, which extends about 3 cables north-westward from its northern extremity, and about 2 1/2 cables south-south-westward from its southern extremity. The island, which is 65 feet (19m8) high to the tops of the trees, is uninhabited. Numerous booby gannets, which are similar to seagulls, inhabit the island."

"The only indigenous mammals are rats, whose activities are by no means restricted to the bush, however. Aside from the rats, lizards are the only other indigenous animals. There are a number of species of lizards, ranging in size from the very tiny to the giant lizards, of which there are two, both of whom were imported from Yap for the purpose of exterminating the rats. (9) Neither rats nor lizards are eaten, and the natives were repelled by the suggestion."

"9. An interesting sidelight on 'primitive logic' confronts us at this point. The natives distinguish each species of lizards by a separate name, and do not classify them under a generic title. To them they are different kinds of organisms, so that one kind is the object of a genuine phobia, but the others are looked upon with indifference."

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133 sand. Out from the beach there was a hundred yards or so of coral platform, largely exposed at low tide, then finally the edge of the reef itself against which the great rollers of the Pacific broke their force all the year around.

133 361 The other inhabited island, Falalap, was rather different: a large, rounded blob sticking out into the sea and spoiling the neat circle of the atoll. The habitations were all on the northwest end of the island, across the narrow pass from Falarik. Here, too, there was a maintained park-like area, corresponding to the lagoon-side coconut grove of Falarik: but on Falalap, coconuts and large breadfruit trees were interspersed, giving a different "feel" to the landscape.

133 137 262 The center of Falalap was largely a great swampy area carefully cultivated by the women of both islands. Two kinds of aroids (taro), *Colocasia* and *Cyrtosperma*, were grown there for their edible, starchy roots which, with breadfruit, formed the staple food of the atoll. We did not get around to exploring this region in any detail until late in the summer.

123 226 The mapping operation was kept up fairly steadily for several days, but there were always intermissions. On Friday afternoon—the second day of the mapping—Bakal and Yani had no difficulty in persuading us to knock off mapping and go spear fishing. We all piled into Bronson's skiff and rowed over to the shore of Ella, outside the pass into the lagoon. Don was rather snooty about this skiff, remarking that a Western rowboat looked like a garbage scow beside the trim and speedy Ifalukian canoes. But Yani and Bakal liked it—perhaps partly because it was foreign, but also because it was steady and because it [136] could hold several people easily. Don, maintaining his scorn, called it the BWUP after one of the more ungainly species of trigger-fish.

227 Yani and Bakal each had steel-pointed wooden spears, about fifteen feet long; and short, slender steel spears. The long spears were for poking; the short spears were shot from a sling. The sling looked like a strip of inner-tube; at one end was a string loop, tied on firmly; at the other end the rubber was tied into a loop just large enough to slip over the thumb. With the rubber loop over the right thumb, the string loop was pressed over a slight notch in the butt of the spear, and the spear then simply pulled back with the left hand and let go. It worked like a Hawaiian sling spear, with the hand replacing the hollow bamboo grip.

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Hawaiian sling spear, with the hand replacing the hollow bamboo grip.

Fish were not too plentiful and all were small. In a short time Bakal got four small surgeon fish of two species and a small bright-colored reef fish. None were over five inches long—which showed that small fish were not scorned as food.

Don had taken his Arbalete spear gun—a complicated and lethal weapon that had as yet hardly been tried. Yani borrowed it, and Don was greatly cheered to see him miss a couple of shots—Don had been feeling sheepish about his own misses. Presently there were loud shouts from Bakal and Yani. Yani, for fun, had shot a big moray eel with the Arbalete gun. (For fun because the Ifalukians do not eat moray eels. Ted explained this as a sort of pact: the Ifalukians did not eat morays or sharks, with the idea that the morays and sharks would reciprocate. The pact was occasionally violated by both the morays and the sharks.)

The spear was deep in the neck of the big eel, but the eel was still lively enough so that we did not dare try to bring it into the boat, and it was impossible to get it off the spear. So we rowed all the way home towing the speared moray behind the boat. After dragging the eel up on the beach, we managed to get the spear out. Don, Bakal and Yani then started out again, swimming, to try for more fish among the coral heads of the lagoon in front of the Fan Nap.

Don got a fine chance at a blue crevelley about a foot long, and hit him right through the middle. Just then, Yani swam up and pointed to a big moray eel completely out of the rocks and swimming rather feebly along the sandy bottom twelve feet below. The eel was partly on its side and seemed to be looking up at them. The thought flashed through Don's mind that some fool had thrown the speared moray back into the lagoon, and there it was, out for revenge.

They had just started to get themselves out of there when a big shark shot by—a huge, grey torpedo. It made a swift circle around Don, Yani and the eel. Yani shouted and thrashed the water with his hands and feet, at the same time making for the nearest coral head, yelling for Don to come. Don was close behind, still with the speared fish. They clambered onto the platform of coral, where they were standing in water about halfway up their thighs, Don holding

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only source of supply, since no trade ship had visited the island for some months.

The captain went ashore on the final trip of the ship's launch. Most of the local population was assembled on the temple grass by the Fan Nap, all decked out with garlands in the hair and wreaths over the shoulders. I introduced the captain to Fagolier. It was a pleasure to watch the chief on such an occasion. He didn't need clothing for dignity: composed and calm, he always seemed pleased to meet the visitors, murmuring the correct phrases in Ifalukian, with no hint of the naked savage meeting civilization. Rather, the overdressed foreigners seemed awkward and out of place.

The captain photographed everyone, called in the sailors who had been wandering around, and took off. We all went down to the beach to see them go, but unhaunted by any desire to be going along. Don, of course, was terribly pleased to get his missing equipment: and I should have been pleased too, since I came to depend on that equipment for the rest of the summer.

That evening there was dancing. Ted thought at first that it was the children, but it turned out to be the young men, lined up by a bonfire, practicing for some big event that they planned presently. I popped flashbulbs at the dancers and Don and Ted watched, while the mosquitoes drained their blood away—another flaw in paradise. The scene was wild and lovely, the dark backdrop of the coconut palms fitfully lit up by the fire, the row of naked bodies trimmed with flowers and anklets and bracelets of coconut leaves, the inflected chanting, the stomping, clapping and rhythmic movement. Don learned pretty well to get the nice resonance that they produced by clapping the cupped right hand against the inside of the bent left arm.

Don got sore at me for popping flashbulbs—he said it spoiled the atmosphere, was an insult to the Ifalukians, and so forth. I suppose I felt sheepish about intruding with a camera myself—but I had thought I was doing my duty in getting a photographic record. Anyway, I took off with my camera in a huff and kept a residuum of photographic inhibition all of the rest of the summer. The camera is a curious thing that way—it takes gall or cheek or impertinence to get good pictures

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123 004 [133] depths. The lagoon deepened rapidly, but there were areas, even in the center, where it was only thirty or forty feet deep, and the shadows of coral heads below could be made out.

502 226 Presently the water began to shoal again, as we approached the reef. For a while the boat could be maneuvered through the sandy channels among the coral heads but all hands had to walk across the reef itself while the boat was pulled through a narrow, shoal, "canoe pass" which, although only a few inches deep, was clear enough of coral to enable the canoes to be floated across the reef.

123 133 I was wearing alpargates, South American canvas sandals, excellent for rain forest, but no good for coal reefs—this was the last day in the life of those sandals, and I had to use great care to make them last even for the walk across the reef. Yani and Bakal were managing nicely in their bare feet, which showed the incredible toughness that the human hide can reach, but even they were walking carefully.

It was something over a thousand feet across the reef. On the far side, on this still morning, there was only a gentle surf from waves averaging only a foot or so high. This was the lee side of the atoll, in terms of the trade winds, but at this season when the trades were not blowing and when the rain was often from the west, the breakers here could be very high, a pulsating line of white on the horizon from the view point of the Fan Nap.

The BWUP was pushed out beyond the breakers and boarded again. [136] Here, outside the reef, was the shark zone, but none were seen all day. Yani said one of his relatives had been attacked by a shark in this region, but had saved himself by pulling off his loin-cloth and covering the eyes of the shark as he charged by.

226 133 The reef shelved off gradually and details of the bottom could be made out clearly in twenty-five or thirty feet of water. The bottom was solidly encrusted with life—corals, coralline algae, sponges and the like—except for the narrow, smooth "surge channels," kept clear by the rush of water along the bottom returning from the surf. They were like ravines along a mountain front.

226 The canoes started playing out the coconut-bedecked rope, finally forming a huge semicircle out from the reef. The rope was weighed down with coral-block anchors and attached to each of the regularly-

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Polynesian cultures, had almost endless ways of catching fish. Individuals or small groups fished with spears or with hook and line. A method that appealed to me particularly was to attach the hook and line to a kite, which was sailed from a canoe in the lagoon: thus combining the pleasures of fishing with those of kite-flying (one of the numerous instances where I couldn't decide whether a particular operation should be called "work" or "play"). There were also a variety of ways of trapping fish, with traps ranging from the large, permanent stone weirs built along the lagoon shore, down through various types of wattle traps, to improvised affairs of plaited coconut leaf sometimes set by the women in the shallows—the only fishing operation of the women, aside from collecting crabs, shellfish and the like. Women, in fact, were subject to various sorts of taboos in relation to fishing, and sex was strictly suppressed during a prolonged fishing operation.

There were various ways of catching special fish, like tuna, bonito and flying fish, when these appeared, but I didn't get to see any of these operations. Later in the summer, however, Don and I did spend a very active day trying to get a complete photographic record of a lagoon seining operation—the kind of fishing called yating.

The Ifalukians had an immense supply of seines—great piles stored in each of the canoe houses. The accumulation of seines and of rope seemed a direct consequence of the almost compulsive male habit of making sennit twine. Whenever a group of men were sitting around gossiping, or helping us gather information, or quietly watching the horizon, some of them would pull handfuls of fluffy leached and pounded coconut fibers out of their purses, and start twisting them into twine. This process, like knitting with the women of the West, did not interfere with either conversation or thought; and since it went on constantly, the twine output was considerable. The sennit twine had a great many different uses, but much of it ended woven into seines.

In the case of the particular yating operation that we photographed, the morning started with groups of men shouldering lengths of seine and carrying them down from the canoe houses to load them into canoes beached on the lagoon shore. The canoes took off in orderly procession, each dumping its seine in turn and connecting with the next until there must have been nearly a mile of seine forming a great

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146 come to view with suspicion these tables giving comparative nutritional
114 values for different parts of the world. Truly, much of the world suffers from malnutrition as compared with the United States or Western Europe; but also, I think, our nutritionists have failed to give adequate attention to possibly varying needs. The food needs of man in Ifaluk and of man in New York are not necessarily the same.

121 One problem with diet studies is the difficulty of keeping track of
262 snacks, of occasional foods; yet such occasional or incidental food may be very important in relation to some vitamin or mineral requirement. We were very conscious of this problem, and Ted and Don made every effort to keep track of incidental food as well as of staples. Yani was particularly helpful in this, because he tried to remember and report all of the incidental things that he and his friends ate as they wandered about during the day. On this basis, there was considerable variety in the Ifalukian food. At least thirty kinds of plants were eaten in one way or another (not counting "medicines"). Don got records
267 of eighty-eight different kinds of fish that were eaten, and guesses that
● 136 there must be many more. For animals, there were also sea turtles, chickens and other birds, and occasionally pigs and dogs. Some seventeen kinds of molluscs were eaten, eight kinds of crustaceans, and a few other things like sea anemones and one kind of sea urchin.

137 We arrived at the height of the breadfruit season. Breadfruit trees grew everywhere, producing far more fruit than could be used; and
[136] the fallen, rotting fruits were probably the chief breeding places of the flies that so plagued us. As the breadfruit harvest dropped later in the summer, so did the numbers of flies.

139 Breadfruit in its season (June through September, with a second,
262 smaller crop in February and March) is the staple food, the chief source of starch, for the people of Ifaluk. It is a staple on most of the islands of the tropical Pacific—the "bread" of Polynesia and Micronesia.

139 The big, starchy fruits grow on a handsome tree, probably native to
245 Malaya. It may well be among the most anciently cultivated of plants and the main food varieties are seedless, completely dependent on man for reproduction. It is propagated from shoots which spring up around the base of the trunk, and the colonizers of the Pacific—

I, of course, made the proper jeers about this culture-bound food aversion of his, which would cut him off from a rich local source of protein. Out of sheer bravado one morning I sucked turtle egg after turtle egg. I got nowhere in my effort to make Don feel foolish (he had great reserves of faith in his own prejudices) but I did make myself very sick. I suspect that the relation between the cramps and the turtle eggs was sheer coincidence; but for the rest of the summer I couldn't face a turtle egg with any more equanimity than Don could, and the eggs that were brought us were disposed of surreptitiously.

The Ifalukians were always bringing us food, more food than we could possibly have eaten with the best will in the world. We protested, but there was no stopping them. Much of it we didn't like—we were a very culture-bound trio, really, perfectly happy with our spam and canned spinach. We felt we couldn't run the risk of hurting the feelings of our hosts by admitting that we didn't much like their breadfruit and boiled pulax, so we would accept the food, eat what we could, and stealthily dispose of the rest in the lagoon at night.

We were always really grateful for gifts of fish, however, and my memories of the summer include the tastiest fish orgies of my whole life. We would turn the fish over to Bakal for fileting and Ted was really a master at rolling the filets in corn meal and frying them in bacon grease as I remarked before, and the Ifalukian fish, fresh out of the transparent waters of the lagoon, were just the right material with which to work.

But while we kept our respect for Ted and the Western method of frying things, we also fell in easily with the Ifalukian method of cooking fish. The commonest and perhaps the tastiest method was simply to roast the fish whole in coals of burned coconut husks. The hardened and carbonized skin could be easily peeled off, to reveal the tasty flesh. I have particularly fond memories of roasted parrot fish. Somewhere, from my Florida childhood, I had got the idea that parrot fish were inedible. I still don't know about the West Indian varieties, but I can certify that the parrot fish of Ifaluk were very edible indeed.

Don and I lost weight during the summer though hardly needing to. I had a gaunt and hungry look, twenty pounds below my normal weight, when I left after three months. I suspect this was our own fault, due to our careless habits of living off casually opened tins of

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CHAPTER VI

FISH WATCHING

DANCE rehearsals continued almost every night, and it was clear that we were expected to attend despite the interference with both work and sleep. Somehow I didn't understand until some time later that this dance business was largely a response to a request of Ted's. He had particularly wanted, during his first stay on the island, to see some of the important traditional dances, the ur dances, but no such ceremonies had taken place. Before we started for Ifaluk this time, Ted had written to the anthropologist of the Trust Territory Government, expressing the hope that we would be there in the proper season for the dances. The anthropologist had passed the word on to the chiefs by way of the trade ship which called at the island about a month before we arrived.

It turned out that we were too late. The proper time for the ur dances is at the close of the period of ceremonial fishing by torchlight for flying fish. But the Ifalukians, wishing to please Ted, rearranged their ceremonial schedule. They couldn't bring the flying fish out of season, but they could perform the dances.

The dances were really, as Ted explained, a religious ceremonial designed to please the gods. But, as Ted further noted, this did not mean that the content had to take some special religious form: the kindly gods of Ifaluk enjoyed whatever interested the people.

Religion seemed in general very unobtrusive on Ifaluk. There were sacred spots like the altar in the back of the Fan Nap (completely unused during our stay); there was the wild tangle of vegetation in sacred

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naming which Ted neatly solved by suggesting Beldame Flats, for the slightly wacky old lady who persisted in making eyes at him during evening dance rehearsals.

Out beyond and to the north of these discrete coral heads lay a great submerged mass of dead coral, which we decided to call the continent of Moo. Moo had a complex topography, with southern and northern outposts and an octopus point, only intermittently inhabited by octopuses during the summer. A great deal of my time was spent floating over the southern outpost of Moo where a big red squirrel fish (*Holocentrus spinifer* to ichthyologists) seemed to get as much pleasure out of watching me as I got out of watching him.

Each coral formation was staked out into a series of territories by little Pomocentrid fish, called "lejoc" by the Ifalukians. The lejoc were only about three inches long, but their belligerence in defending their territories was in no way proportional to their size. We spent a lot of time teasing them. A foot, a hand, any new and foreign object intruded into the territory always caused great indignation—was always the object of fierce attack.

Each fish defended a roughly circular territory two or three feet in diameter, with boundaries marked by features of the coral landscape, and with a centrally located crevice or hole where the lejoc would lurk when not warding off intruders.

Biologists define a "territory" as an area defended by an individual, a pair, or a group, against intrusion by others of the same species. Many kinds of mammals, birds, reptiles and fish show territorial behavior, though until recently the matter had been little studied in fish, and there is still a great deal to be learned. The lejoc were clearly territorial in the strict sense, individuals clinging to the same area day after day and defending it against intrusion. My big red *Holocentrus* may also have been showing territorial behavior, since he (or she?) stayed in the same small area off Moo all summer. But I never noticed the *Holocentrus* showing aggressive behavior. Perhaps the outpost of Moo was a "home range" rather than a "territory" for this individual: the difference would depend on behavior in relation to another *Holocentrus* swimming into the area, a situation that I never had a chance to observe.

The water was full of marvels. Don had a category of what he

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The water was full of marvels. Don had a category of what he
●136 called "unlikely animals"—animals he never would have thought of if
126 he had been in charge of animal design. Any one of the three of us, cruising around with our goggles, would be likely to shout to the others to come see some new marvel he had just discovered for the first time.

136 I remember the afternoon Ted called out "come look at this—here is a helicopter fish!"

Sure enough there was a sort of squat fish hovering in mid-water near Marie (Ted was apt to do his fish watching near the coral head named after his wife) with fins split into long narrow rays which, in their movement, had reminded Ted of a helicopter. The fish seemed completely indifferent to our watching; presently it went into forward gear and moved slowly and sedately off.

We looked through the fish books and presently made out that it was *Pterois*, a "scorpion fish" or "lion fish." We learned that the protruding spines were poisonous, which probably accounted for its calm indifference. We subsequently saw these fish several times in our swimming area, but they were not among the regular, territorial inhabitants.

The synaptid sea-cucumber was another unlikely animal. Most sea-cucumbers have a reasonably cucumber-like form (though one kind on Ifaluk achieved an almost watermelon-like size). The synaptids, however, are long, slender, snake-like affairs. The species in our swimming area had a bright, almost black-and-white checkered pattern that reminded me of some of the South American vipers like the fer-de-lance. Stretched out from under a coral head, the sea-cucumber looked for all of the world like a fer-de-lance crawling out from under a rock. Only, when you looked closely, you saw not the menacing, triangular head of the viper, but instead, where the head should be, a rather silly-looking tuft of waving plumes. And when you picked this unlikely animal up, you found, not firm flesh, but a limp, tissue-paper-like affair. I always thought of them as the tissue paper fer-de-lances of the coral heads.

Don thought that the giant clams should be included among the unlikely animals, but he was looking at them as a zoologist, thinking of their unlikely physiology and structure. The giant clams (*Tridacna*)

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of the Ifaluk lagoon were not really giant, perhaps because people found them and ate them before they had time to reach an unlikely size. To a non-zoologist, they didn't look unusual, except for the lovely colors of the margins of the partly-opened shell and of the flesh of the animal disclosed within.

Don gave me the following explanation of the unlikely physiology of the clams (in terms of the studies of C. M. Yonge on the Tridacna of the Great Barrier Reef of Australia):

"The animal has thousands of microscopic plants, single-celled algae, in its blood. The part of the body of the clam, exposed to the sun when the shell is open, bears hundreds of tiny lenses that focus the light into pools of blood below the skin, turning the superficial tissues into a sort of greenhouse. The algae in the blood are transposed from here and digested in the blood stream in the vicinity of the gut and "liver," providing a part of the clam's diet. The rest of the Tridacna's food is assorted small plankton, filtered from the water by the gills and taken in through the mouth. Algal food digested in the blood leaves fecal wastes there—in effect the beast is defecating in its blood stream. How to get rid of the fecal wastes in this unlikely place?

"The animal, like other clams, has a pair of kidneys; in other clams these excrete nitrogenous wastes from protein breakdown. But in Tridacna these nitrogenous wastes are picked up quickly by the algae and used as a fertilizer. Tridacna's urine is almost pure sea water. But the animal has found a 'new' use for its kidneys—each acts as a sort of accessory anus to eliminate the fecal wastes left in the blood by algae digestion there. The 'farming' operation has involved complex physiological changes affecting the whole organism."

We think of molluscs as slow, deliberate animals, but these *Tridacnas* can close their shells with extraordinary speed and decision. One of our amusements was to poke things at the clams to watch the suddenness with which they could snap shut. It is quite believable that the big ones could catch a diver's foot and hold him until he drowned —a standard hazard now in Pacific movies.

Don dedicated quite a lot of time to octopus watching. Octopus Point, along the west coast of the continent of Moo, got its name from a small octopus that made headquarters there the first few weeks of

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136 the summer. Just about the time that we had decided that this octopus had a permanent home there, it disappeared and our daily checks would reveal only the empty hole. Then Don found another small octopus living in a hole in the center of the coral we named after Maroligar.

The octopuses were suspicious creatures, and while they would often be partially outside when first found, they would slowly withdraw into the recesses of their holes under the steady gaze of the observer. There was always a pile of small coral fragments outside the hole, and as an octopus retreated, these fragments were pulled in by the sucker-covered arms to block the entrance—except that generally a small peep-hole was left, framing a watchful octopus eye.

The area around the hole on Maroligar reef was littered with debris from the meals of the octopus: empty shells, claws and legs from the crabs it had eaten. Don picked up all of these and saved them—a food record on the octopus. Every day he would find the remains of more crabs, so that he got a record of the diet of this crab-loving octopus over a period of several weeks.

Then, one day, the hole on Maroligar was empty, and it remained empty for quite a while. Thus we got the impression that these octopuses would make headquarters in one place for days, or weeks, but that they did not stay permanently in any one place, did not establish "territories" the way so many of the other lagoon inhabitants did.

I only once saw an octopus swimming in the daytime. I wouldn't have seen this if it hadn't moved—a piece of a brown coral mass I was looking at suddenly gave a few convulsive movements and then shot off, jet fashion, with trailing tentacles, to the next coral head where it stopped, again blending perfectly into the background. I swam slowly toward the place where it had disappeared, but just as I got near enough so that I could distinguish octopus from coral, it took off again, this time disappearing into the depths of the lagoon.

133 126 I have been writing glibly about "coral" and "coral heads." Actually, these patch reefs were built up of a wide variety of lime-secreting organisms, many of them not true corals. We picked one of the patch reefs, Maroligar, and tried to make a map of the different kinds of organisms that were contributing to its structure. We thought this